

LMI Training Institute
June 16-20, 2003

Prepared by the Staff of the LEHD Program

June 2, 2003

Chapter 1

QWI Basics

State and local authorities increasingly need detailed local information about their economies to make informed decisions — and yet are frustrated by the lack of timely local data. The LEHD/state partnership works to fill critical data gaps and provide indicators needed by state and local authorities.

The LEHD/State Partnership is an ongoing project using existing data to provide new information about the economy. Specifically, this project integrates state administrative data and Census data products, allowing improved labor market information. Both the state partners and the Census Bureau benefit from this sharing of information. The state partners fulfill their mandate of providing high quality regional labor market information and the Census Bureau uses state administrative data to improve Census Bureau economic and demographic survey estimates.

The LEHD/State Partnership

What state partners provide: States that have agreed to a voluntary partnership with the Census Bureau provide state unemployment insurance (UI) wage record and ES202 data, their data expertise, and their state-specific knowledge to the Census Bureau under the parameters specified in the Memoranda of Understanding (MOU) between Census and each of the state partners.

What Census partners add: The Census Bureau exploits its large computing power, Census data technologies as well as economic and demographic survey information to create high quality labor market information for the state partners.

What the Census Bureau delivers to state partners: States receive three key products from the Census Bureau: (1) quarterly workforce indicators (QWI) providing information about the state economy at detailed industry and geography level, (2) enhanced UI data, (3) information about changes in economic entities (successor/predecessor firms). State partners also receive periodic reports on customized research done in collaboration with the Census Bureau

State partners receive 29 quarterly employment indicators about the state economy for each county, for each industry, and for each quarter the state provides data; enhanced UI wage records; and information about successor/predecessor firms. Each of these deliverables is described in greater detail in the following sections.

1.1 The Quarterly Workforce Indicators

The LEHD program uses new technology to create a unique set of timely quarterly indicators of economic activity. Just as national economic indicators measure the performance of the overall economy, these local indicators measure the performance of the local economy—where jobs are, for what kind of workers, how much workers can expect to make and employers expect to pay them. Because these indicators were developed in as a result of a partnership between the Census Bureau and the states, they are unique in their ability to serve local needs.

The QWI are created by integrating state administrative data with Census data using LEHD technology and extensive computing resources. As shown in the graph above, LEHD uses common identifiers from these disparate data sources to produce high-quality local employment, earnings, turnover, job growth, and place of work and residence indicators. These indicators are then disclosure proofed to remove identifying information and released to the state partners, who can use them to answer important questions about the local economy.

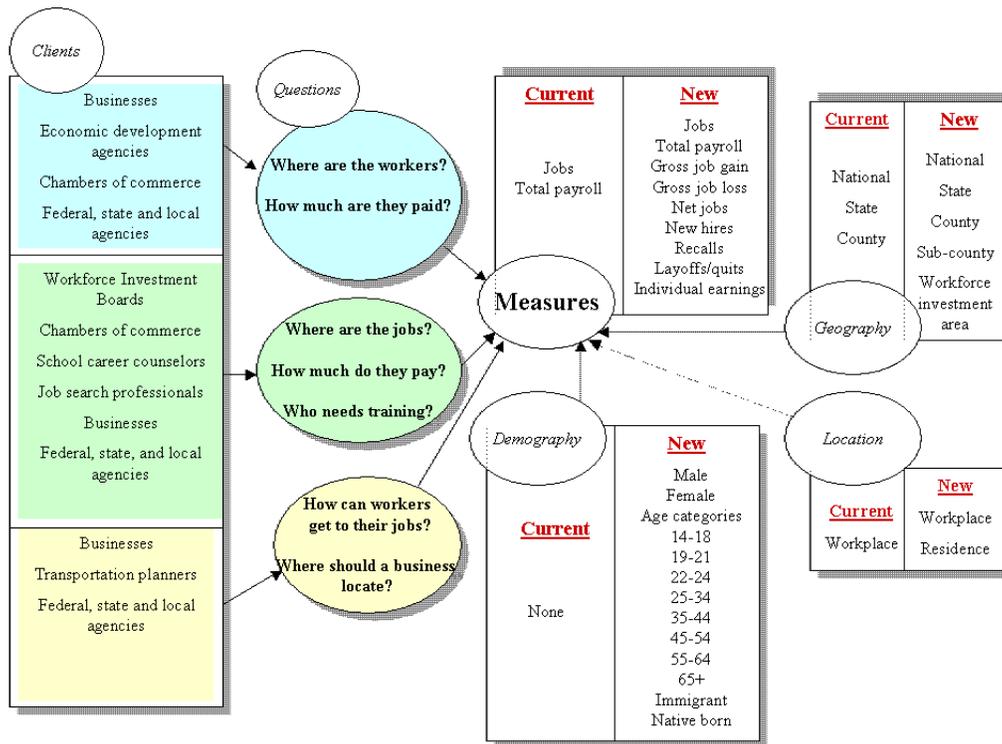


Figure 1.1: The Quarterly Workforce Indicators

The Longitudinal Employer - Household Dynamics Program

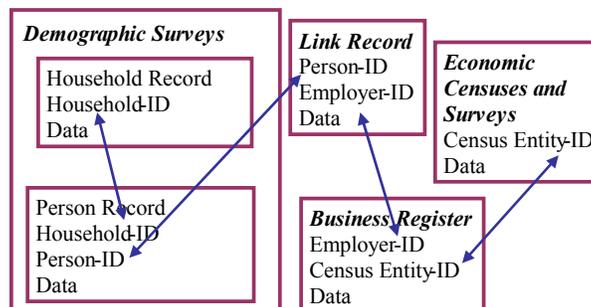


Figure 1.2: The LEHD Program

1.1.1 QWI Applications

State and local decision makers – businesses, workers, economic development agencies, Workforce Investment Boards, transportation planners and educational institutions - need high-quality labor market information to make informed decisions. The Quarterly Workforce Indicators provide information that can help answer questions such as:

- What are the characteristics of the labor force in a particular area?
- How high is worker turnover in specific areas and in specific industries?
- Where are the jobs?
- What are workers (and new hires) in a particular region and industry being paid?
- Where do workers live, and where do they work?

The QWI provides this information as well as information on many other labor market indicators such as: measures of hires and layoffs for different types of workers, measures of employment by where people work and where they live, and detailed measures of labor market turnover in different industries, measures of job gain and loss in each industry, and what workers are affected by each.

What are the characteristics of the local labor force?

The QWI's can be used to provide detailed information about the local labor market: who's employed in what industry – at the county, workforce investment board area (WIA's) and metropolitan area level of detail.

This information - together with comparisons to other counties and WIA's - can be distributed to government departments, chambers of commerce, local businesses and economic development agencies.

How high is worker turnover?

The QWI's can be used to generate a measure of worker turnover . Workers can use this to identify the likely duration of employment in an industry; firms can use it to benchmark their turnover with that of other employers in the industry, WIBs can use it as a performance benchmark, and state and local agencies can use it as a measure of workforce quality (particularly in service oriented industries, like nursing homes).

Where are the jobs?

Change characterizes the U.S. economy. The QWI's provide more information on this change – by identifying growth industries, those industries hiring workers, and targeting the opportunities for different types of workers. This helps workers, firms and placement agencies.

What are workers (and new hires) in a particular region and industry being paid?

These are probably the most useful of all the measures that are provided by the QWI's. Employers need to know what workers are being paid, and what to pay new hires. Workers need to know what pay they can make in different kinds of industries – and what they can make after they've been in the industry for a few years. Placement agencies need to know what different types of jobs are likely to pay, and educational institutions need benchmarks so they can measure the performance of their graduates. Economic development agencies need to tell prospective businesses what the workforce earns.

Where do workers live, and where do they work?

The Quarterly Workforce Indicators provide measures of employment by where people work as well as where they live. This information allows transportation planners to know where new roads and public transportation should be located. Because the QWI's measure employment over time, transportation agencies can use the trends to develop better projections of future transportation needs. These measures can also be used by community colleges and other educational institutions to identify where their potential clients live and work.

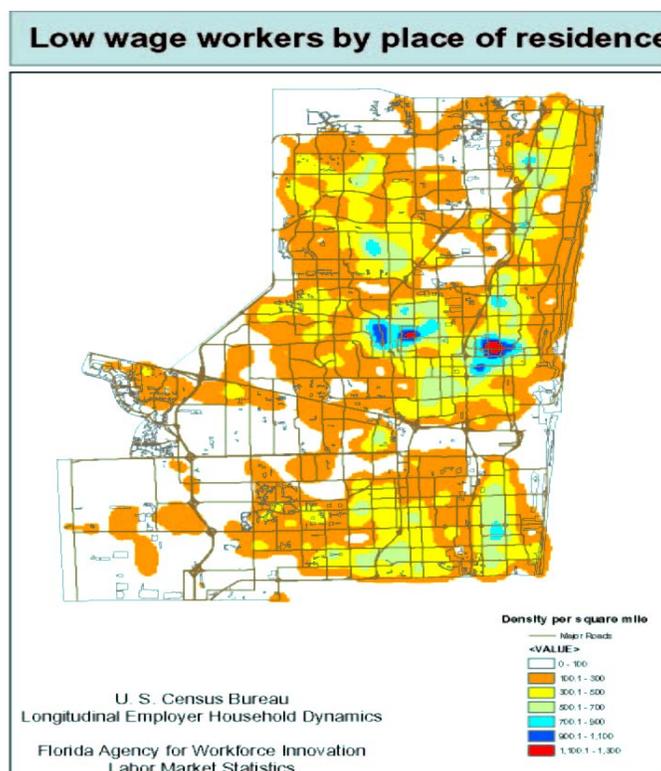


Figure 1.3: Residences of Low Wage Workers

Other LEHD products of interest to states

Analysis of low-wage workforce: LEHD has worked with state partners to identify the low-wage population in each state, and to examine issues such as the transition of low-wage workers out of low-wage work and the location of low-wage workforce. The later information is a great aid to transportation planners, as low-wage workers are a major user of public transit systems. Maps of low-wage worker concentration such as the one shown in this section can aid planners in mapping bus routes and planning mass transit schedules.

Edited wage records: State partners receive edited wage record data created at the Census Bureau using Census name-matching technology to identify false name-SSN matches and to identify likely 'true' matches in the employment history data.

Successor/Predecessor firms: The LEHD partnership uses worker flows to improve information on changes in economic entities over time. Information on changing economic entities is of interest to states in of itself, and also helps the partnership improve measures of employment dynamics by suppressing false job changes.

Immigration: The Census Bureau is analyzing data to describe the evolution of the immigrant population in each state over the 1990s and into 2002.

Aging: The Census Bureau is using partnership data to describe the change in the demand for older workers over time

Measures of workforce skill: The Census Bureau staff has developed measures of worker skill, for each worker in the dataset. These measures allow states to examine the skill composition of their workforce, and what industries are 'upskilling' or 'downskilling' their workforce.

1.1.2 More information: QWI variables

For more information on QWI variables and their meanings, see Appendix A.

1.1.3 Using the CD-ROM

Opening your CD-ROM will reveal 19 files (where 'yourstate' denotes your state's postal abbreviation).

qwi_yourstate_wia_county_sicdiv_csv.zip
qwi_yourstate_wia_county_sicdiv_dbf.zip
qwi_yourstate_wia_county_sicdiv_sas.zip
qwi_yourstate_wia_metro_sicdiv_csv.zip
qwi_yourstate_wia_metro_sicdiv_dbf.zip
qwi_yourstate_wia_metro_sicdiv_sas.zip
qwi_yourstate_wia_sic2_csv.zip
qwi_yourstate_wia_sic2_dbf.zip
qwi_yourstate_wia_sic2_sas.zip
qwi_yourstate_wia_sic3_dbf.zip
qwi_yourstate_wia_sic3_csv.zip
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qwi_yourstate_wia_sic4_csv.zip
qwi_yourstate_wia_sic4_dbf.zip
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qwi_yourstate_wia_wib_sicdiv_csv.zip
qwi_yourstate_wia_wib_sicdiv_dbf.zip
qwi_yourstate_wia_wib_sicdiv_sas.zip
qwi_yourstate_contents.lst

These are the SAS, DBF, and CSV files for the QWI data at the SIC division level, the SIC two-digit, three-digit, and four-digit level, with SIC division level data at the county, metro, and WIB geography levels. Of particular interest to states is are the CSV files, easily opened with Microsoft Excel for quick access to QWI data (for those interested in using the SAS files but do not have access to SAS, access to SAS is available through the CRADC accounts, which are described later in this booklet).

Using Excel to generate tables

The slides following show how to use the county level .csv file in Excel to create pivot tables quering specific data. In this example, data is selected to rank the top industries by employment in Montgomery County MD during the year 2001 and create a pie chart using that table.

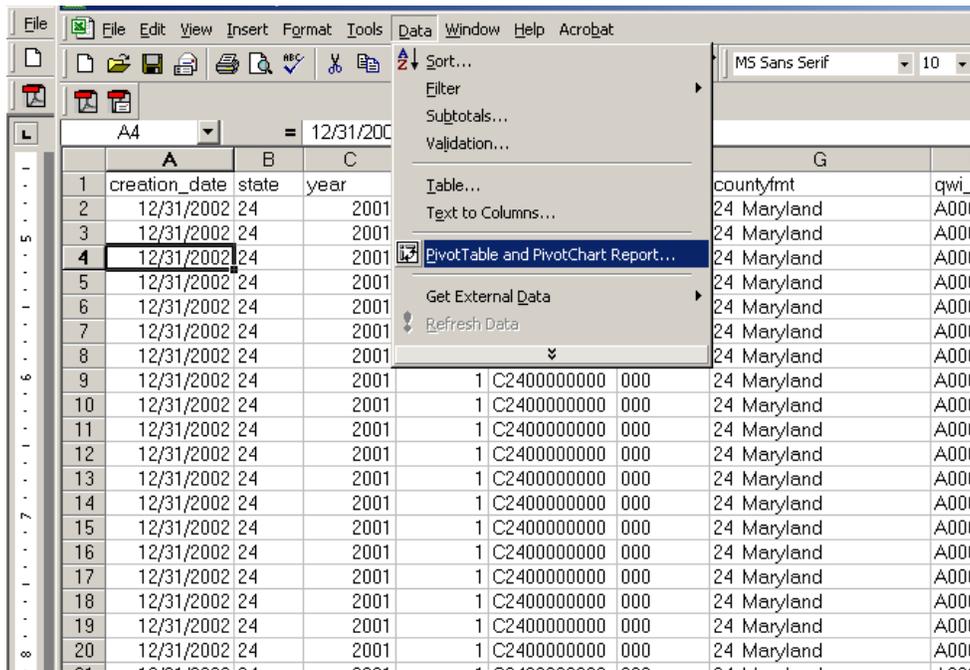


Figure 1.4: Selecting Pivot Table

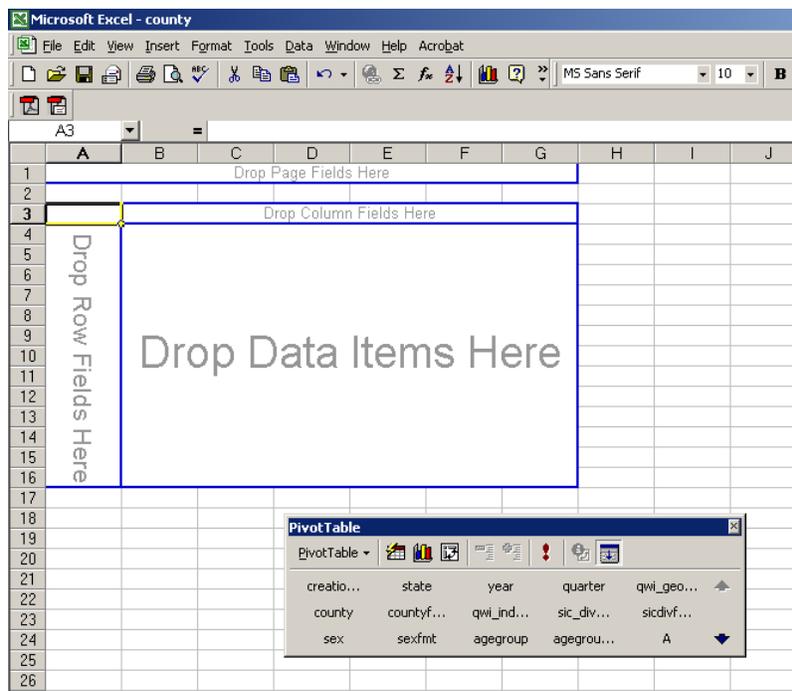


Figure 1.5: The Pivot Table Fields

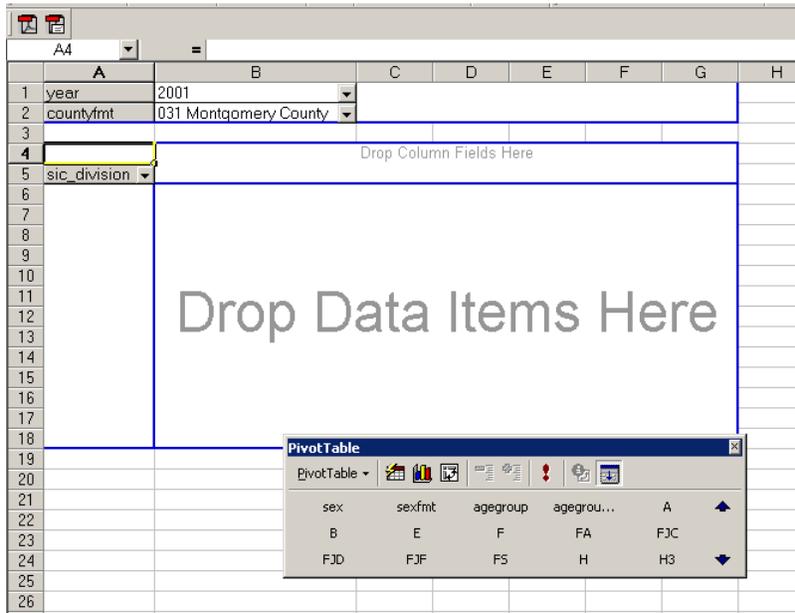


Figure 1.6: Filling the Pivot Table Fields

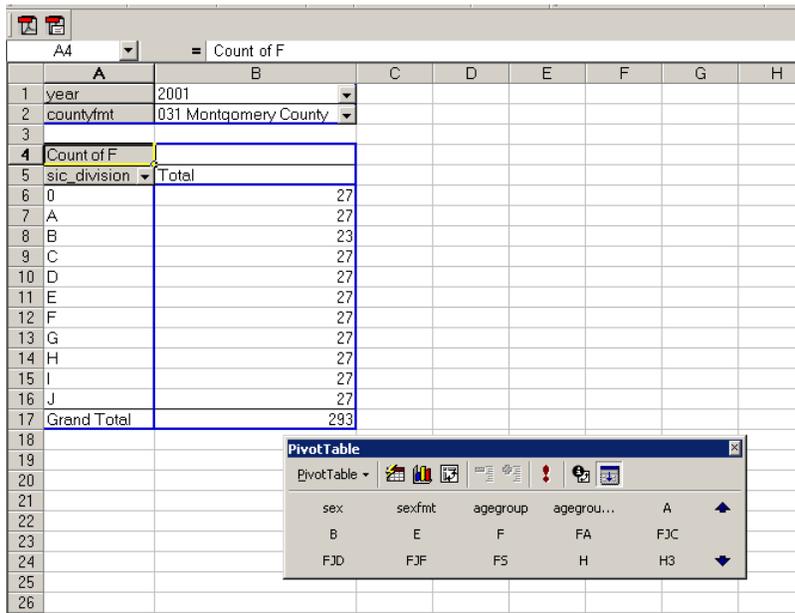


Figure 1.7: Putting Full Quarter Employment in the Data Field

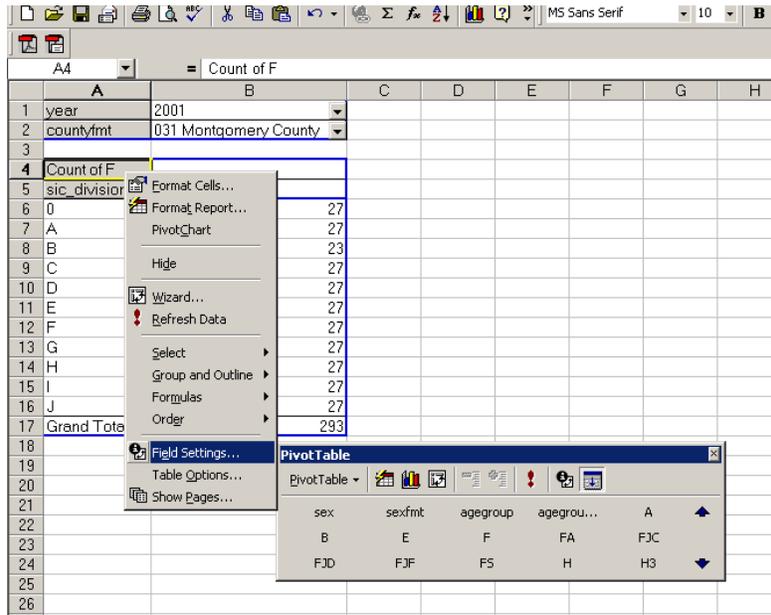


Figure 1.8: Changing the Field Settings

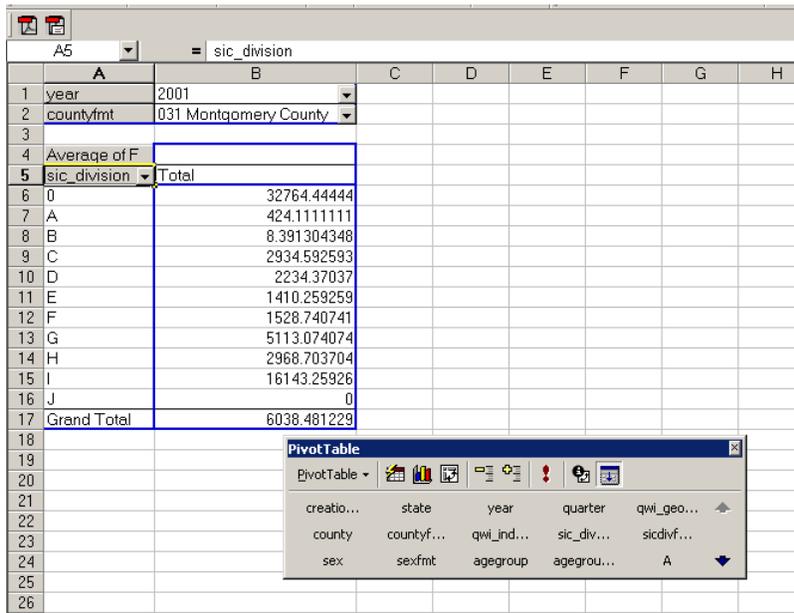


Figure 1.9: After Changing the Field Formats

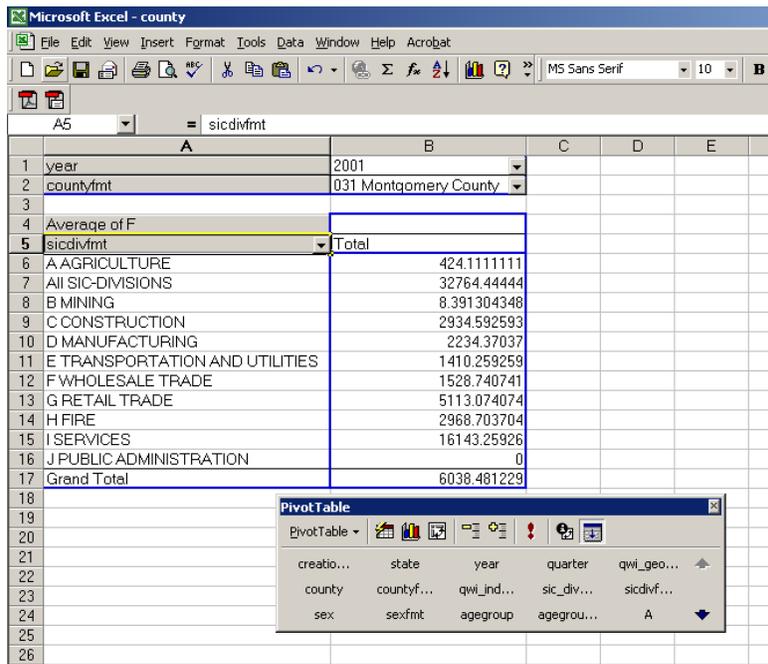


Figure 1.10: Using Formatted Variables

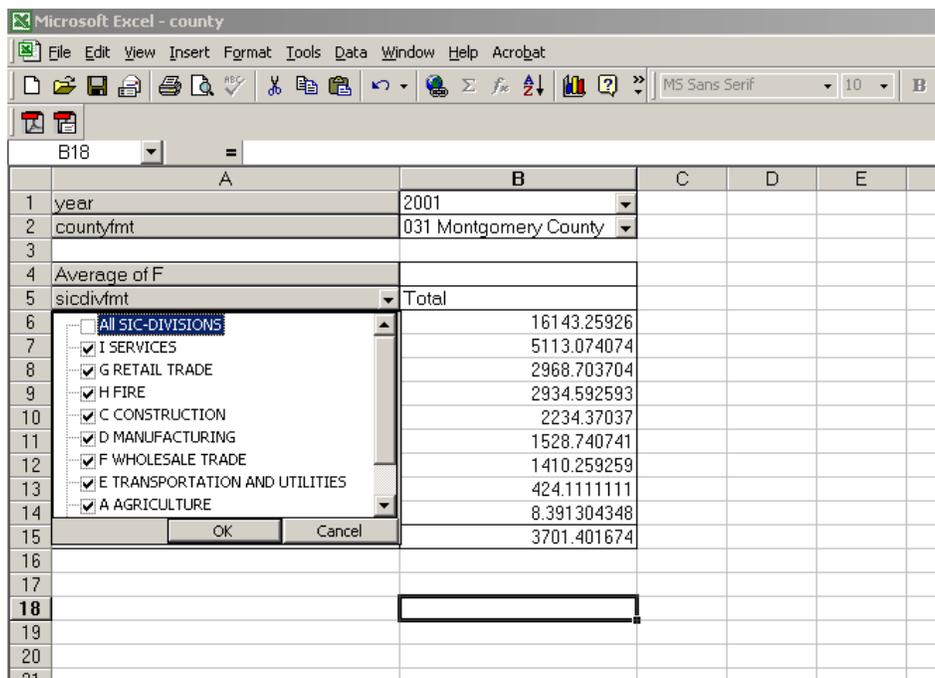


Figure 1.11: Changing What Data Appears on the Table

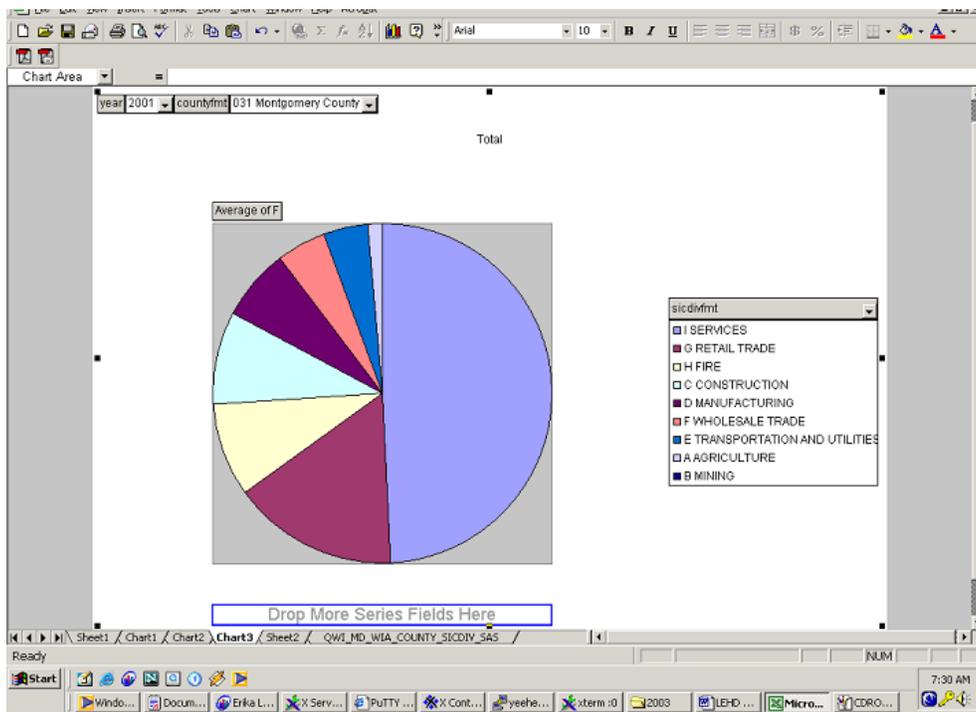


Figure 1.12: Making a Chart of the Data

QWI Variable Descriptions (public use variable name/internal variable name)

Employment Indicators	Definition	Technical Definition	Questions Answered	Useful Statistics
Total Employment (TotalEmp/M)	Total number of <i>jobs</i> with positive earnings in the current quarter.	$m_{ijt} = 1$ if wage > 0 for worker i at employer j in t . $= 0$ otherwise. $M_{jt} = \sum m_{ijt}$	Who is filling what jobs? What industries are biggest employers? What industries employ the largest number of a particular type of worker?	Top area industries
Beginning of Quarter Employment (BeginEmp/B)	Total number of <i>workers</i> who were employed by the same employer in both the current and <i>previous</i> quarter (point in time measure similar to ES202).	For $t > qfirst$, $b_{ijt} = 1$ if wage > 0 for worker i at employer j in t and $t-1$. $= 0$ otherwise. $B_{jt} = \sum b_{ijt}$	Same as for total employment, but with a focus on 'core' employment.	Top employers of young workers/older workers/female workers, etc.
End of Quarter Employment (EndEmp/E)	Total number of workers who were employed by the same employer in both the current and <i>subsequent</i> quarter.	For $t < qlast$, $e_{ijt} = 1$ if wage > 0 for worker i at employer j in t and $t+1$. $= 0$ otherwise. $E_{jt} = \sum e_{ijt}$	Same as for beginning of quarter employment but with a different point in time definition of 'core' employment	Identifying similar local economies for exchanging best practices.
Full Quarter Employment (FullEmp/F)	Total number of workers who were employed by the same employer in the <i>current, previous, and subsequent</i> quarter	For $qlast > t > qfirst$, $f_{ijt} = 1$ if wage > 0 for worker i at employer j in $t, t+1$ and $t-1$. $= 0$ otherwise. $F_{jt} = \sum f_{ijt}$	Same as for beginning of quarter employment but with different definition of 'core' employment	Same as above

QWI Variable Descriptions (public use variable name/internal variable name)

Employment Change Indicators	Definition	Technical Definition	Questions Answered	Useful Statistics
Accessions (Acc/A)	Total number of workers who were employed by a business during the current quarter, but not the previous quarter.	<p>For $t > qfirst$,</p> <p>$a_{ijt} = 1$ if if wage>0 for worker i at employer j in t and wage=0 at j in $t-1$. $= 0$ otherwise.</p> <p>$A_{jt} = \sum a_{ijt}$</p>	<p>What industries are hiring the most workers? Which industries are hiring older workers? Young workers? What geographic areas are doing the most hiring?</p>	<p>Top industries hiring in the area. Top industries hiring men/women/young/old.</p>
New Hires (Hire/H)	Total number of accessions that were also not employed by that employer during the previous four quarters.	<p>For $t > qfirst + 3$,</p> <p>$h_{ijt} = 1$ if if wage>0 for worker i at employer j in t and wage=0 at j in $t-1, t-2, t-3$, and $t-4$. $= 0$ otherwise.</p> <p>$H_{jt} = \sum h_{ijt}$</p>	<p>Same as accessions, but focus on new hires.</p>	<p>Same as above.</p>
Full-Quarter New Hires (FulHire/H3)	Total number of new hires who are full-quarter.	<p>For $t > qfirst + 4$,</p> <p>$h3_{ijt} = 1$ if wage>0 for worker i at employer j in $t-1, t$, and $t+1$ and wage=0 at j in $t-2, t-3, t-4$, and $t-5$. $= 0$ otherwise.</p> <p>$H3_{jt} = \sum h3_{ijt}$</p>	<p>Same as new hires but focus on core employment hires</p>	<p>Same as above</p>

Employment Change Indicators	Definition	Technical Definition	Questions Answered	Useful Statistics
Recalls (Recl/R)	Total number of accessions that were employed by that employer at some time during the previous four quarters.	For $t > qfirst + 3$, $r_{ijt} = 1$ if wage > 0 for worker i at employer j in t and wage $= 0$ at j in $t-1$ but wage > 0 for i at j in $t-2$ or $t-3$ or $t-4$. = 0 otherwise. $R_{jt} = \sum r_{ijt}$	Same as accessions but with focus on workers who are recalled to jobs.	What industries are recalling workers? What types of workers are being recalled?
Separations (Sep/S)	Total number of workers who were employed by a business in the <i>current</i> quarter, but <i>not in the subsequent</i> quarter.	For $t < qlast$, $s_{ijt} = 1$ if wage > 0 for worker i at employer j in t and wage $= 0$ at j in $t+1$. = 0 otherwise. $S_{jt} = \sum s_{ijt}$	What workers are leaving jobs? What industries are workers leaving?	Together with accessions can be used to construct turnover measures for workers and industries.
Accessions to Full-Quarter Employment (FulEmpFlw/A3)	Total number of workers who began work with employer in last quarter and are full-quarter employed in the current quarter.	For $qlast > t > qfirst + 1$, $a3_{ijt} = 1$ if wage > 0 for worker i at employer j in t , $t-1$, and $t+1$ and wage $= 0$ at j in $t-2$. = 0 otherwise $A3_{jt} = \sum a3_{ijt}$	Which industries are hiring 'core' workers?	
Separations from Full-Quarter Employment (FulSep/S3)	Total number of workers full-quarter employed in previous quarter but separate in current quarter.	For $qlast > t > qfirst + 1$, $s3_{ijt} = 1$ if wage > 0 for worker i at employer j in t , $t-1$, $t-2$ and wage $= 0$ in $t+1$. = 0 otherwise. $S3_{jt} = \sum s3_{ijt}$	What industries are 'core' workers leaving?	

QWI Variable Descriptions (cont.)

Job Growth Indicators	Definition	Technical Definition	Questions Answered	Useful Statistics
Job Creations (JobCreate/JC)	The number of new jobs that are created by either new area businesses or the expansion of employment by existing firms.	$JC_{jt} = \hat{E}_{jt} \times \max(0, G_{jt})$ where $\hat{E}_{jt} = (B_{jt} + E_{jt})/2$ $G_{jt} = (B_{jt} - E_{jt}) / \hat{E}_{jt}$	What industries are creating the most jobs?	Top regions of job creation Top industries creating jobs
Job Destructions (JobDes/JD)	The number of jobs lost to the economy by businesses that are lost or who contract employment.	$JD_{jt} = \hat{E}_{jt} \times \text{abs}(\min(0, G_{jt}))$ where $\hat{E}_{jt} = (B_{jt} + E_{jt})/2$ $G_{jt} = (B_{jt} - E_{jt}) / \hat{E}_{jt}$	What industries are eliminating jobs?	Top regions of job loss Top industries contracting employment.
Net Job Flows (JobFlowNet/JF)	The difference between current and previous employment at each business.	$JF_{jt} = E_{jt} - B_{jt}$	Which industries are expanding employment? Contracting employment?	Fastest regions of employment growth Top expanding industries.
Net Change in Full Quarter Employment (FulJobFlw/FJF)	The difference between current and previous full quarter employment at each business.	$FJF_{jt} = F_{jt} - F_{jt-1}$	Which industries are expanding 'core' employment? Contracting?	Top expanding industries Top contracting industries

QWI Variable Descriptions (cont.)

Earnings Indicators	Definition	Technical Definition	Questions Answered	Useful Statistics
Average Earnings for Full-Quarter Employees (EarnFul/Z_W3)	Total earnings of all full-quarter employees divided by the number of full-quarter employees, converted to a monthly basis by division by 3.	$ZW3_{jt} = W3_{jt}/F_{jt}$ where: $W3_{jt} = \sum w3_{ijt}/3$ $w3_{ijt}$ = earnings of i at j in t if $f_{ijt}=1$ and 0 otherwise.	What are the average earnings of 'core' employees?	Highest paying area jobs.
Average Earnings for End-of-Period Employees (EarnEnd/Z_W2)	Total earnings of all end-of-quarter employees divided by the number of end-of-quarter employees, converted to a monthly basis by division by 3.	$ZW2_{jt} = W2_{jt}/E_{jt}$ where: $W2_{jt} = \sum w2_{ijt}/3$ $w2_{ijt}$ = earnings of i at j in t if $e_{ijt}=1$ and 0 otherwise.	What are employees earning in particular industries?	Industries with highest earnings growth in the region.
Average Earnings for Full-Quarter Accessions (EarnFulAcc/Z_WA3)	Total earnings of all full-quarter accessions divided by the number of full-quarter accessions, converted to a monthly basis by division by 3.	$ZWA3_{jt} = WA3_{jt}/A3_{jt}$ where: $WA3_{jt} = \sum wa3_{ijt}/3$ $wa3_{ijt}$ = earnings of i at j in t if $a3_{ijt}=1$ and 0 otherwise.	What are new employees earning?	What are the best paying jobs for new employees in a particular industry? In a particular region?
Earnings Indicators	Definition	Technical Definition	Questions Answered	Useful Statistics

Average Earnings for Full-Quarter New Hires (EarnFulHire/Z_WH3)	Total earnings of all full-quarter new hires divided by the number of full-quarter new hires, converted to a monthly basis by division by 3.	$ZWH3_{jt} = WH3_{jt}/H3_{jt}$ where: $WH3_{jt} = \sum wh3_{ijt}$ $wh3_{ijt} = \text{wage of } i \text{ at } j \text{ in } t$ if $h3_{ijt} = 1$ and 0 otherwise.	What are new hires earning? (Similar to above, but excludes recalled workers.)	What are the best paying jobs for new hires in a particular industry? In a particular region?
Average Change in Earnings for Accessions (ChgEarnAcc/Z_dWA)	The difference between total earnings earned in the current quarter and the previous quarter for workers who started with a new employer in the current quarter, averaged over all accessions for that employer, converted to a monthly basis by division by 3.	$\Delta wa_{ijt} = \text{earnings}/3 \text{ of } i$ $\text{at } j \text{ in } t \text{ minus}$ $\text{earnings}/3 \text{ of } i \text{ at } j \text{ in } t-1$ if $a_{ijt} = 1$ $= 0$ otherwise.	What is the improvement (or lack) in earnings for workers starting with a new employer in a particular industry?	Top industries associated with earnings growth for new employees.
Average Change in Earnings for Separations (ChgEarnSep/Z_dWS)	The difference between total earnings earned in the subsequent quarter and the current quarter for workers who separate from their employer in the current quarter, averaged over all separations from that employer, converted to a monthly basis by division by 3.	$\Delta ws_{ijt} = \text{earnings}/3 \text{ of } i$ $\text{at } j \text{ in } t+1 \text{ minus}$ $\text{earnings}/3 \text{ of } i \text{ at } j \text{ in } t$ if $s_{ijt} = 1$ $= 0$ otherwise.	What is the improvement (or lack) in earnings for workers separating from an employer in a particular industry?	Industry separations associated with greatest earning loss (to target for worker training programs).
Total Quarterly Payroll (Payroll/W1)	Total earnings paid to all workers who earned positive wages in the current quarter.	$W1_{jt} = \sum w1_{ijt}$ $w1_{ijt} = \sum \text{all UI covered earnings by } i \text{ at } j \text{ during } t$	What are the dominant industries in the region in terms of total earnings paid to workers?	

QWI Variable Descriptions (cont.)

Periods of Non-Employment Indicators	Definition	Technical Definition	Questions Answered	Useful Statistics
Average Periods of Non-employment for Accessions (NonEmpAcc/Z_NA)	Average number of quarters previous to the current quarter for which accessions to this employer have no wage records (up to 4).	For $qfirst + 3 < t$, $na_{ijt} = \sum_{1 \leq s \leq 4} n_{it-s}$ if $a_{ijt} = 1$ $= 0$ otherwise. where $n_{it} = 1$ if $m_{ijt} = 0 \forall j$.	How long on average are non-employment spells?	Industries whose workers have longest non-employment spells.
Average Periods of Non-employment for New Hires (NonEmpHire/Z_NH)	Average number of quarters previous to the current quarter for which new hires to this employer have no wage records (up to 4).	For $qfirst + 3 < t$, $nh_{ijt} = \sum_{1 \leq s \leq 4} n_{it-s}$ if $h_{ijt} = 1$ $= 0$ otherwise. where $n_{it} = 1$ if $m_{ijt} = 0 \forall j$.	Similar to above.	Regions with longest/shortest non-employment spells.
Average Periods of Non-employment for Recalls (NonEmpRecl/Z_NR)	Average number of quarters previous to the current quarter for which recalls to this employer have no wage records (up to 4).	For $qfirst + 3 < t$, $nr_{ijt} = \sum_{1 \leq s \leq 4} n_{it-s}$ if $r_{ijt} = 1$ $= 0$ otherwise. where $n_{it} = 1$ if $m_{ijt} = 0 \forall j$.	How long are workers not employed before being recalled to jobs?	
Average Periods of Non-employment for Separations (NonEmpSep/Z_NS)	Average number of quarters after the current quarter for which separations from the employer have no wage records.	For $qfirst + 3 < t$, $ns_{ijt} = \sum_{1 \leq s \leq 4} n_{it-s}$ if $s_{ijt} = 1$ and 0 otherwise. where $n_{it} = 1$ if $m_{ijt} = 0 \forall j$.	How long are workers separating from employers not employed?	

QWI Variable Descriptions (cont.)

Demographic and Timing Variables	Definition	Questions Answered	Useful Statistics
Industry division	Standard Industrial Classification (1987 basis) Division code (A=agriculture, etc.)	Allows comparison of different industries within a geographic area.	Top 10 area industries. Industries associated with greatest earnings growth for new hires.
Industry	Standard Industrial Classification (1987 basis) detailed industry code. Identified as 2-digit, 3-digit, or 4-digit classification.	Same as above, at a greater level of industry detail.	Same as above, at greater level of industry detail.
Year	4-digit calendar year.	Allows for time-series analysis.	Changes in core employment growth in health services from 1995-2000.
Quarter	1-digit quarter of estimate.	Allows for time-series analysis.	Cyclicality in retail services earnings in 1999.
State	State from which data was received. (FIPS code)		
County	3-digit county FIPS code.	Allows detailed portrait of economy at county-level.	Counties with fastest employment growth. Highest paying industries for young men in county.
WIB	Workforce Investment Board (special codes)	Allows detailed portrait of economy at WIB-level.	Similar to county.
Metro	Metropolitan area (FIPS codes)	Allows detailed portrait of major urban areas	Similar to county
Sex	Denotes whether data cover men, women, or both genders.	Allows breakdown of labor market information by gender.	Best paying industries for older women.
Age Group	Denotes which of eight age categories are covered by the data, or if data cover all ages.	Allows breakdown of labor market information by age group.	Top industries for older workers. Best paying industries for young men.